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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/637,570 | 08/14/2000 | Seiichi Kondo | NIT-215 | 8469 |

7590 04/24/2002
Mattingly Stanger & Malur PC
104 East Hume Avenue
Alexandria, VA 22301

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| EXAMINER |
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NGUYEN, HA T

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| ART UNIT | PAPER NUMBER |
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2812

DATE MAILED: 04/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/637,570

Examiner

Ha T. Nguyen

Applicant(s)

KONDO ET AL.

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2002.
- 2a) ☐ This action is FINAL.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 22 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 August 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 14 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "similar" in claims 14 and 17, line 3 is a relative term which renders the claim indefinite. The term "similar" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371⁶ of this title before the invention thereof by the applicant for patent.

3. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaufman et al., U. S. Patent 6063306 (Hereinafter Kaufman).

Kaufman discloses a method comprising using a polishing liquid containing an oxidizing substance, a phosphoric acid, and a protection-layer forming agent; wherein said oxidizing substance contains hydrogen peroxide, and said phosphoric acid contains one selected from the group of orthophosphoric acid and phosphorous acid; and wherein said protection-layer forming agent contains benzotriazole (see col. 4, line 53-col. 55). Hawley's dictionary is cited to show that in the normal use "phosphoric acid" means "orthophosphoric acid"

Claim Rejections - 35 USC § 103

Application/Control Number: 09/637,570
Art Unit: 2812

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103[®] and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 6, 9, 10, 13-15, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman in view of Chora, U.S. Patent 6276996.

[Claim 6] Kaufman discloses a polishing method comprising removing a metal film formed over an insulating film by using a polishing liquid containing an oxidizing substance, a phosphoric acid, benzotriazole (See abstract, col. 1, lines 40-65 and col. 4, line 53-col. 55). Kaufman also discloses the use of a surfactant in the polishing liquid. But it does not disclose expressly the use of a polymeric surfactant in the polishing liquid.

[Claims 9, 10, 13-15, 19, and 20] Kaufman discloses a polishing method comprising removing a first metal film of a barrier metal formed on an insulating film and a second metal film of copper formed on the surface of said first metal film (See abstract and col. 1, lines 40-65); wherein said second metal film is polished using a first polishing liquid which contains an oxidizing substance, a phosphoric acid, and a protection-layer forming agent (col. 4, line 53-col. 55), and said first metal film is polished using a second polishing liquid obtained by adding an abrasive to said first polishing liquid (see col. 7, line 23-col. 9, line 23); and the second polishing liquid contains the protection-layer forming agent in a larger amount than said first polishing

Art Unit: 2812

liquid (see col. 6, lines 37-42 and col. 8, lines 27-44). But it does not disclose expressly that the first polishing liquid is free of abrasive.

However, the missing limitations are well known in the art because Chora discloses these features (See col. 3, lines 3-25). The combined teaching of Kaufman and Chora does not teach the dry etching of the first metal film and the reducing atmosphere plasma cleaning exposed surface of metal for its adherence to a subsequently formed interconnect. However, the examiner takes Official Notice that these are well known in the art.

A person of ordinary skill is motivated to modify Kaufman with Chora because Chora teaches that polymeric surfactant is conventionally used in polishing liquid to reduce surface tension (see col. 3, lines 5-11) and to obtain satisfactory results.

Therefore, it would have been obvious to combine Kaufman with Chora to obtain the invention as specified in claims 6, 9, 10, 13-15, 19, and 20.

6. Claims 4, 5, 7, 8, 11, 12, 16-18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman in view of Chora, as applied to claims 6, 9, 10, 13-15, 19, and 20 above, and further in view of Loncki et al., U.S. Patent 5860848 (Hereinafter Loncki).

The combined teaching of Kaufman and Chora discloses the limitations of claims 4, 5, 7, 8, 11, 12, 16-18, and 21, as shown above.

But it does not disclose expressly the use of a carbonyl-containing polymer, or a polyacrylate material in the polishing liquid.

However, the missing limitation is well known in the art because Loncki discloses this feature (See col. 5, lines 4-44).

A person of ordinary skill is motivated to modify Kaufman and Chora with Loncki to obtain effective polishing.

Therefore, it would have been obvious to combine Kaufman and Chora with Loncki to obtain the invention as specified in claims 4, 5, 7, 8, 11, 12, 16-18, and 21.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha Nguyen whose telephone number is (703)308-2706. The

Art Unit: 2812

examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each first bi-week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Neibling, can be reached on (703) 308-3325. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Ha Nguyen
Primary Examiner
04 - 19 - 02